DOCUMENT RESUME

ED 227 301 CE 035 334

AUTHOR	Rice, Eric
TITLE	Evaluating Apprentice Performance. Instructor Training Module #9.
INSTITUTION	Conserva, Inc., Raleigh, N.C.
SPONS AGENCY	Office of Vocational and Adult Education (ED), Washington, DC.
PUB DATE	82
CONTRACT	300-80-0937
NOTE	36p.; For related documents, see CE 035 315-335.
PUB TYPE	Guides - Classroom Use - Guides (For Teachers) (052)
EDRS PRICE	MF01/PC02 Plus Postage.
DESCRIPTORS	*Academic Achievement; *Apprenticeships; Discussion (Teaching Technique); Educational Certificates; Evaluation Criteria; *Evaluation Methods; Inservice Teacher Education; Postsecondary Education; *Student Certification; *Student Evaluation; *Work Attitudes

ABSTRACT

Part of a series of instructor training modules on related subjects instruction for apprentices, this booklet deals with evaluating apprentice performance. The first chapter consists of an outline of the scope and content of the instructor training modules as well as a self-assessment pretest. Covered in the module are assessing apprentice knowledge and skills, assessing apprentice work-related attitudes and values, discussing individual evaluation results with apprentice learners, and developing instruction to certify skills and knowledge upon completion of the program or course. Each chapter contains some or all of the following: an introduction and objectives, instructional text, an example, additional information, and self-test exercises. Appended to the booklet are answers to the self-test exercises, a posttest, and answers to the posttest. (MN)

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ED227301

EVALUATING APPRENTICE PERFORMANCE

Instructor Training Module #9

Eric Rice

U.S. DEPARTMENT OF EDUCATION
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Glossary

The words on this list are used in this booklet. Please review the terms and learn the definitions. The meanings of the words as used in the text may not be the form of the word with which you are familiar.

Words/Terms

1. *Anecdotal* In the form of a short narrative statement about an incident or behavior usually as related by an observer
2. *Application* A use to which something is put
3. *Appropriate* Fitting or especially suitable
4. *Assess* To determine the importance, size or value of something
5. *Attitude* A feeling, emotion, posture and subsequent behavior toward a fact, state or situation
6. *Certify* To confirm or inform with certainty in a formal way to someone else; some set of facts or results
7. *Confirmation* The support of an idea or conclusion through evidence
8. *Conjunction* The state of being joined together
9. *Consensus* A judgement arrived at or agreed to by a group
10. *Continually* Occurring indefinitely
11. *Evaluation* The process of determining the value of an object, program, or effort
12. *Explicit* Clear and publicly stated
13. *Invaluable* of great worth
14. *Interaction* Mutual influence or discussion
15. *Legitimacy* Acceptability within general rules and standards
16. *Limitation* A restriction or boundary
17. *Negative construction* Using the words *Not* or *Never* in sentences
18. *Norms* Expected, average behavior
19. *Performance* The execution of action or activity in accord with fulfilling some expected requirement
20. *Periodically* Occurring over time at expected intervals
21. *Performance Achievement Testing* The type of assessment that focuses on what a learner actually knows and can do as well as how well he/she can do it.
22. *Plausible* Appearing worthy of belief
23. *Prescribe* To lay down a rule
24. *Prespecified* Laid out or indicated in detail or explicitly as a rule before an activity occurs
25. *Orientation* The usual general or lasting direction of thought or position
26. *Representative* Serving as typical example
27. *Scenario* An outline or account of a proposed course of action or events
28. *Self-Reporting* Answering for one's self
29. *Specification* A detailed or explicitly stated expectation
30. *Testing* The process of collecting data or information on a sample of behavior or performances

1. How To Use This Booklet

What Is The Series About?

Related subjects instruction is an essential part of every apprenticeship program. It is the program component through which apprentices are taught the background theory and range of application of associated technical subjects such as mathematics, science and safety. Related instruction usually takes place in a classroom, after the regular work is over. Most frequently, related instruction is taught by a skilled tradesperson or craftworker. For the tradesperson or craftworker to be an effective trainer, he or she must not only know their trade skills, but also they must use teaching skills appropriate for conveying that information to apprentices. This series of materials is written to train related subjects instructors in the critical teaching skills necessary to perform their jobs effectively. The titles of the booklets in the series are:

1. *Introduction to Related Subjects Instruction and In-Service Training Materials*
2. *Planning the Apprenticeship Program*
3. *Planning Related Subjects Instruction*
4. *Developing Instructional Materials for Apprentices*
5. *Presenting Information to Apprentices*
6. *Directing Learning Activities for Instruction*
7. *Providing for Individual Learner Needs*
8. *Controlling Instructional Settings*
9. *Evaluating Apprentice Performance*
10. *Communicating with Apprentices*

The first booklet introduces the series, describes the content of each booklet, and provides an overview of apprenticeship and of adult learners. The second booklet describes how to plan an apprenticeship program and may be used by related instructors, sponsors or service agencies. Each of the other eight booklets deals with a set of training skills judged by a panel of experts on apprenticeship to be critical to working effectively as a related subjects instructor.

What Is This Booklet About?

Each of us evaluates options before making decisions. We consider alternative materials and tools to use to finish a job; we judge the positive and negative aspects of different car makes before making a purchase; we examine products before deciding if a job was done correctly. In each instance, we consider, judge, and value information. Based on our judgment—or evaluation—we make decisions and take action.

As a related instructor, you must evaluate apprentice performance. You must determine if apprentices are learning the necessary skills, attitudes and knowledges to work as competent journeyworkers. Further, you must report to the program sponsor apprentice progress in mastering this content. To perform effectively in these tasks, you must use a variety of skills associated with developing and using tests and test results. This booklet provides instruction in four of the most important skills involved with evaluating apprentice performance:

1. Assess Apprentice Knowledge and Skills
2. Devise/Use Instruments to Assess Work Attitudes and Traits
3. Discuss Individual Evaluation Results with Apprentices
4. Develop Instrumentation to Certify Skills Upon Completion of Course

What Must I Do To Complete My Work In This Booklet?

Working your way through this booklet will require you to read the text, to answer the questions, to perform the exercises, and to complete the pre- and post-assessment instruments. Expect to spend about five hours working through the materials. The only resources you need to complete your work in this booklet are: (1) a copy of the booklet; (2) a pencil or pen; (3) about two hours of time; and (4) recollection of past related instruction experiences.

The materials are written in a self-instructional, programmed format. You may work through the text, examples and questions at your own pace and leisure; you need not complete your work in the booklet at one sitting.

Each chapter in the booklet is devoted to a single skill. The general format of the chapters is similar, with the following parts:

1. An *introduction* describing the skill and the instructional objectives for that skill.
2. *What* is, *when* and *why* to use the skill.
3. Step-by-step *directions* for how to perform the skill.
4. An *example* of how the skill is used in related instruction.
5. A *self-test exercise* to apply the information about the skill.

6. Additional *sources of information.*

This booklet concludes with an appendix that contains the answers to the self-test exercises from each chapter and the posttest.

Your activities in working through this booklet will include, in order, the following things:

- Complete the self-assessment;
- Read and consider in detail the introduction and objectives for each skill;
- Read and study the text, examples and illustrations provided for each skill;
- Complete the self-test exercise for chapter and compare your answers with those provided in the appendix;
- If you complete the exercise as directed continue your work in the booklet; if you fail to answer the questions correctly, repeat your work in the chapter under consideration; and
- At the conclusion of the booklet, complete the posttest for the unit. Check your answers against those provided. If you exceed the criteria, continue your work in the nest booklet. If you fail to demonstrate mastery, repeat portions of this booklet as needed.

How Much Do I Know About The Subject Before I Begin?

The self-assessment will assist you to focus on competency areas associated with evaluating apprentice performance. Read each competency statement listed in Figure 1 and assess your level of knowledge about and your level of skill in performing that task. Knowledge means what you know about the subject while skill means your experience in successfully performing the task. Circle the number that best describes your level of knowledge and skill. Competencies where your ratings are poor or fair are those that you should concentrate on. Pay particular attention to the chapters which deal with those competencies.

Figure 1. Evaluating Apprentice Performance Self-Assessment

Chapter in Book	Competencies		Rating			
			Poor	Fair	Good	Excellent
2. Skill: Assess apprentice knowledge and skill	1. Distinguish between different types of tests (knowledge stimulation, and sample) based on setting and purpose	Knowledge Skill	1 1	2 2	3 3	4 4
	2. Construct tests of the work sample, knowledge and simulation types	Knowledge Skill	1 1	2 2	3 3	4 4
	3. Construct multiple choice test items	Knowledge Skill	1 1	2 2	3 3	4 4
	4. Construct short answer test items	Knowledge Skill	1 1	2 2	3 3	4 4
	5. Critique and correct test items	Knowledge Skill	1 1	2 2	3 3	4 4
	6. Construct checklists	Knowledge Skill	1 1	2 2	3 3	4 4
3. Skill: Devise and use instruments to assess work attitudes and values	7. Identify important work-related attitudes	Knowledge Skill	1 1	2 2	3 3	4 4
	8. Construct and use rating scales	Knowledge Skill	1 1	2 2	3 3	4 4
	9. Construct and use anecdotal records	Knowledge Skill	1 1	2 2	3 3	4 4
4. Skill: Discuss individual evaluation results with apprentices	10. Identify functions of discussing test results	Knowledge Skill	1 1	2 2	3 3	4 4
	11. Explain and use procedures for discussing individual evaluation results	Knowledge Skill	1 1	2 2	3 3	4 4
5. Skill: Develop instrumentation to certify and report skills upon completion of course	12. Develop individual performance records	Knowledge Skill	1 1	2 2	3 3	4 4
	13. Develop group or long-term performance record	Knowledge Skill	1 1	2 2	3 3	4 4
	14. Develop individual time records	Knowledge Skill	1 1	2 2	3 3	4 4

2. Skill: Assess Apprentice Knowledge And Skills

Introduction And Objectives

Evaluating apprentice skills and knowledges is an essential and inescapable duty of all related subjects instructors. Unfortunately, few teachers of adults, including many related studies instructors, have had formal training in tasks associated with testing. Instead, evaluation skills have been learned through trial-and-error. As a result, testing too often emphasizes less important information or generates information that may be of little use to you as an instructor.

The purpose of these materials is to ensure that you are not entrapped by these short-comings. Working through these materials will sharpen your evaluation skills and knowledges so that you and the apprentices you train benefit from the time and effort you jointly invest in assessing learning and performance during related instruction. When you have completed your work in this unit of materials you will demonstrate your competence in evaluating trainee knowledge and skills by being able to:

1. Distinguish between types of tests useful for assessing knowledge and skills;
2. Critique sample test items; and
3. State the rules for constructing various types of test items.

Why, What And When To Test

The type of testing with which you must be concerned is named "Performance Achievement Testing" or "PAT" in this set of materials. It is well-suited to related subjects instruction because it is action-oriented and uses observable behavior to assess learning.

There are three major types of performance achievement tests, each of which is useful for related instruction evaluation. They differ mainly in the degree they resemble the work setting. The choice of what type of test to use is yours. Make your decision based upon the learning outcomes you desire and the material to be tested. The three types of tests are: (1) work sample, (2) simulation and (3) knowledge. In apprenticeship training you must attend to each type of test. In related studies, your particular concern is with simulation and knowledge type tests; the work sample test usually is employed in the on-the-job portion of instruction. Each type of test is discussed on the following several pages.

Work Sample

The work sample test is the type of performance achievement test with the highest degree of realism. Use it to measure direct application of knowledge and skills on the job. Usually a work sample test the sample test requires apprentices to demonstrate learning outcomes on the job by evaluating work procedures and products on a sample set of tasks. The sampled tasks must include the most critical elements of the skills and knowledges that have been taught. Also they must be representative of the total range of possible performance outcomes. To insure that you have selected the most critical learning outcomes to test, usually you and the journeyman supervisor should analyze the job and reach consensus about the importance of required tasks, skills and knowledges. To insure that the apprentice to be tested understands the expectations of the performance situation, you should write out the test directions. Include information about the sequence of work activities and any test directions such as how to record answers, how scoring will be accomplished, the value of different answers and time limits for certain questions and tasks.

Frequently a work sample test will involve several work stations and many apprentices. In such instances, each apprentice works alone at a single work station, performing required tasks while other apprentices work individually at other work stations. Time limits are placed on activity at each work station. When time expires, the apprentices move on to another station. Learning outcomes for each apprentice are tested at each work station. The activity at each work station should be independent of work at any other work station. Usually, because of the number of apprentices and work stations, assessment will include use of checklists, rating scales and written learner answer sheets. A different test answer sheet is usually necessary for each work station.

Simulation

The simulation type of performance achievement test has a fairly high degree of realism. It emphasizes the application of necessary skills and knowledges. Simulation tests take one of two forms: work-setting and situation. In the work-setting form of simulation, the apprentice is presented with a problem like the type he or she will encounter on the job. Emphasis is placed on using proper procedures or on diagnosing or analyzing the problem appropriately. The idea in designing the test is to replicate some of the critical

elements of the work setting while controlling the risk factor for the apprentice, the employer and the consumer.

The situation form of simulation is like the work-setting simulation except that instead of using equipment on a work sample, the apprentice merely applies the skills or knowledges to a described situation. The situation can be presented as a role play, as practice or as written description. In each instance, you as an instructor present the apprentice with a life-like situation(s) in which he or she must manipulate job-related skills and knowledges to solve a work problem or perform a work task.

Examples of simulation type tests include written tests that require the apprentice to imagine himself/herself as a journeyman in a work setting and to respond appropriately to a series of situations. For example, a petro-chemical maintenance apprentice could be presented with a scenario in which an electronic recording or regulating instrument fails. The apprentice could be asked to describe, one step at a time and in order, how he or she would diagnose the equipment problem. In addition, once the problem was diagnosed, the apprentice could be asked how to correct the difficulty. The apprentice could be required to describe the evidence that he or she would accept as confirmation of certain difficulties causing the problems and the evidence that he or she would require to believe that the problem was corrected.

Knowledge

The knowledge type of performance achievement test has two forms: identification and recall. The identification type of test involves providing the apprentice with background information either as a question or in a situation and requires the apprentice to identify the procedure or tool necessary to deal with the situation. If the test requires identification of tools or tool parts, you should require also that the specific function of the tool or part be noted.

The traditional tests given in most educational settings are the recall type test. These paper and pencil tests require learners to recognize, recall and distinguish between the knowledge learned in a unit of instruction in order to answer specific questions about that content. This type of test is useful in related instruction *if* there is prerequisite knowledge about content that is critical and yet is neither immediately observable in an outcome performance nor appropriate for simulation type testing.

Examples of knowledge type questions include questions that require the apprentice to recognize or recall certain facts about selected topics. For example, sometimes apprentices are asked to recall facts about building codes, safety regulations or scientific principles. Identification type tests often require apprentices to choose appropriate tools or materials. For example, a carpentry apprentice might be given a set of situations about fastening together various materials and be required to select from drawings or actual materials the correct fastening device for each situation. In this example, you also might ask the apprentice to explain why he or she chose each device in each situation.

Testing must take place at appropriate intervals throughout the related subjects instructional process. To be most useful, it should be a standard activity that occurs after completing a unit of instruction. At a minimum, you must assess acquired knowledge and skills in time for the periodic review of each apprentice by the program sponsor.

The decisions you must take in order to evaluate acquired knowledge and skills include (a) determining what kind of test to give, (work sample, simulation or knowledge); (b) the type of test you want to use; and (c) the content of the specific test item. For purposes of related subjects instruction, three types of test items are recommended: (1) multiple-choice, (2) short-answer and (3) checklists. The usefulness of the times for the different types of tests varies. Multiple choice and short answer items are useful on both types of simulation and knowledge tests. Checklists may be used only with simulation-work setting and knowledge-identification types of tests. Checklists cannot be used with knowledge-recall or simulation-situation type tests.

How To Construct And Use A Test To Assess Apprentice Knowledge And Skill

Given the necessity of evaluating apprentice learning, spend your assessment time as productively as possible. Use the following suggested steps to insure a good return on your time investment.

Step 1: Select Test Type and Timing

Review your Plan for Instruction noting the performance objectives for the unit of materials and the suggested times for testing. Decide when in the instructional cycle you want to test trainees. As you review the performance objectives and content, decide what kind of test you want to use, given the descriptions presented in this unit. Remember that simulation and knowledge tests are useful for related instruction. Both types of tests are used in these training materials.

Step 2: Write Test Items

Review the types of test items that are applicable within test types. Consider the relative advantages and limitations of each of the three suggested item types and determine what type of item you will use. Use the information in the

following paragraphs on item type in making your decision and writing items. Regardless of the type of test and kind of test item you use, remember the following guidelines for writing good test items:

1. Avoid using ambiguous statements in any of the test material;
2. Avoid using vocabulary that is difficult or unrelated to the desired learning outcome;
3. Avoid using unclear directions;
4. Avoid using complicated syntax or sentences; and
5. Avoid providing unintended clues to the correct or best answer.

Multiple-choice items

Multiple choice items offer great flexibility for assessing all types of performance outcomes because you as instructor control the background information, the alternative answers, and the level of performance the apprentice must demonstrate to answer the question correctly.

A multiple-choice item is made up of two parts. The first part is called the stem. The stem is written as a question or presentation. It provides the background information for the test item as well as the specification of the type of operation the apprentice must use to answer the item correctly. The second part of the item is the set of alternative answers, one of which is either the correct answer or the best answer for the problem presented. The other alternative answers are called distractors. In the following example, the stem and the alternatives are identified.

Stem: Which of the following types of non-verbal communication usually conveys the most information?

Alternatives:

a. voice tone
b. eye contact
c. hand gestures
d. posture

The major advantages of multiple-choice items are flexibility and scoring ease. The major disadvantages are the amount of time it takes to write good questions and the fact that, occassionally, the correct or best answer will be guessed by an apprentice who did not know the answer. The rules you should follow when writing multiple-choice The rules you should follow when writing multiple-choice items will simplify item construction and decrease the likelihood of an apprentice correctly guessing the answers. The rules are as follows:

1. Design each item to measure an important learning outcome. Ignore unimportant or irrelevant information. Use the behavioral objectives to determine the content areas of the items.
2. Present only one clearly formulated problem or question in the stem. Explain exactly what is being asked and include necessary information to answer the question. Avoid unnecessary information. The stem should be understood without looking at the alternatives.

   Example:

   Poor stem: While everyone processes information mentally at a different rate what is the average number of words per minute most people can process?

   Better stem: About how many words per minute can the average person's mind process?

3. Construct four (4) or five (5) alternative answers for each stem. Be sure that only one alternative is correct or represents the best possible answer.
4. When possible avoid negatively stated items, either in stems or alternatives. If negative construction is used, emphasize the negative construction by underlining or capitalization.

   Example:

   Poor construction: Which of the following behaviors is not a bad listening habit?

   Better construction: Which of the following behaviors is *not* a bad listening habit?

5. Write each alternative so that it is grammatically consistent with the item's stem. Also, try to make each alternative approximately the same length as all other alternatives.

   Example:

   Poor construction: When offering feedback to a speaker after receiving a communication, you should:

   a. describe what you saw and think you heard so you deal with the facts
   b. focus on behavior and individual personality
   c. focus on judgement and evaluation

   Better construction: When offering feedback to a speaker after receiving a communication, you should:

   a. focus on description and observation
   b. focus on behavior and individual personality
   c. focus on judgement and evaluation

6. Randomly use each alternative postition for correct answers in approximately equal numbers. Too frequently test makers avoid the first and last positions while concentrating on the middle position. This

means use approximately equal amounts of options a, b, c, and d or 1, 2, 3, and 4 for the correct answer among the alternatives.

7. Develop each item so that either it is independent of other items or so that all items that depend upon the same background information are identified clearly in the directions.
8. Unless important, avoid using choices of "all of the above" and "one of the above" since both contribute to guessing or can be used as clues.
9. Make all alternative answers plausible and avoid clues that may permit elimination of incorrect answers or guessing of the correct answer. Exercise care so that you avoid (a) using key words in the stem and alternatives; (b) stating the best or correct answer in formal or textbooklike language; (c) stating the best or correct answer in greater detail; and (d) using two responses with the same meaning.
10. Improve alternatives by (a) stating each in the language of the learner; (b) using common misconceptions or errors; and (c) making each alternative similar in wording, length, emphasis and kind.

You may use multiple-choice items for both simulation and knowledge-type tests. They can be written to assess both knowledge of subjects and application of information to realistic situations. Each of the examples displayed in Figure 2 demonstrates use of a multiple-choice question to assess a skill or knowledge on a different type of related subjects instruction test. Note that some items are simply knowledge-recall while other items require the learner to apply information to answer the question correctly.

Short-answer items

Short-answer items can be used for the same purposes as multiple-choice items. They are somewhat easier to construct, but more difficult to score because of partially correct answers, penmanship and obtuse responses. However, they are as useful as multiple-choice items. Tests frequently will include items of each type.

The item-writing rules for short-answer questions include the following:

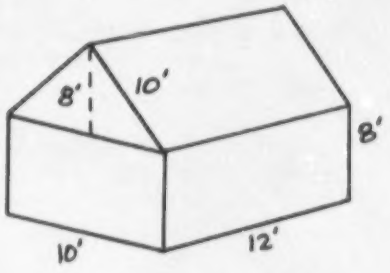
1. Construct items so that the required response is concise, brief and clear
2. In general, use a direct question rather than using an incomplete statement to ask the question.

   Example:

   Poor construction: The formula for finding the surface area of a rectangle is _____ .

   Better construction: What is the formula for finding the surface area of a rectangle?

Figure 2: Examples of Multiple-Choice Questions

Type of Test	
Knowledge - Recall	1. A fulcrum is a(n) a. lifting machine b. pivot point on a lever c. unit of acceleration d. inclined plane
Knowledge - Identification	2. The tool illustrated is a: a. hacksaw b. compass saw c. bandsaw d. ripsaw
Simulation - Situation	• Using the following drawing solve each problem below. Show all work on back of sheet.  3. The total surface area above ground of the figure in square feet is approximately: a. 692 square feet b. 642 square feet c. 722 square feet d. 672 square feet 4. The total volume of the figure in cubic feet is approximately: a. 1,440 cubic feet b. 1,920 cubic feet c. 1,680 cubic feet d. 2,160 cubic feet

Correct answers: 1. b; 2. a; 3. d; 4. a.

Answer: _____ .

3. Limit the length of space for answers by setting word number limits. Also make all blanks of equal length.
4. Relate questions clearly to prescribed learning outcomes.
5. Prescribe the length of time that is available for constructing the answer and do not permit a choice of questions.

Scoring short-answer tests is both more time consuming and more difficult than scoring multiple-choice questions. To simplify this task, construct a model answer to use as a guide before giving the test. Be sure to consider how you will grade answers that are "close" or partially correct.

As you grade the papers, mark the same answer on each apprentice's paper rather than marking all answers on any one paper at one time. This will insure more consistency in grading each question for all apprentices. The techniques also will help you to keep grading time to a minumum and to insure that you treat all apprentices equally.

Checklists

Checklists are useful for evaluating work setting-simulations and work samples. Focused specifically on procedures rather than products, checklists direct an observer's attention to critical aspects of performance such as necessary skills and knowledges. They offer the observer a yes/no alternative for deciding whether the specified aspect of performance in question was displayed. The observer notes the occurrence of the desired performance at the appropriate spot on the checklist as the apprentice works. You score a checklist by summing the number of checks and comparing the sum, as well as the specific items checked, against the performance criteria.

The limitations of the checklist include: (1) it fails to indicate how well or thoroughly the aspect of performance was enacted; (2) it is subject to the individual judgement of each observer; and (3) it is limited to skills and knowledges that have observable characteristics.

Step 3: Construct the Test

Use the following guidelines to put your items into a test:

a. Number serially and consecutively every test item in order that you can track trainee progress. This also will help you score the test and discuss results with individual apprentices.

b. Identify individually each response alternative within each test item that offers alternatives. Each alternative must have its own letter (a, b, c) or number (1, 2, 3). Usually letters are preferred since items are numbered.

c. Arrange items and information on a page so that they are readable, orderly and uncluttered.

d. If it is a paper and pencil test, position every test item on the page so that all information pertaining to that item is on that same page. Also provide a specific and standard way to respond as well as a place for test answers.

e. Write comprehensive test directions that explain the test purpose, the time allowed to complete the test, and how to record the answers.

f. Reproduce the test and use with the apprentices in your charge.

Example

A. W. Belfour, a related subjects instructor for plumbing apprentices, was responsible for the first year of related instruction in a four-year program. Apprentices in the program were reviewed every six months so his testing had to provide results to the sponsor at least that often. As he reviewed his plan for instruction, including performance objectives and proposed course content, he decided that the best testing schedule would place a test at the end of each content unit. This meant about one test every six weeks. The content units were topics such as cutting structural openings, characteristics of different types of materials and so forth. Using the steps suggested in this chapter, he decided to use simulation-situation type tests where possible. Also, he decided to use a series of short-answer and multiple-choice type test items. As he surveyed the materials on measuring, cutting and assembling pipe, he developed test items like those displayed in Figure 3. Note that he followed the steps listed in the unit as well as the rules for writing multiple-choice and short-answer items. Belfour reported the results to the sponsor at the conclusion of each unit of material. He was confident that he had assessed both knowledge and application.

Figure 3: Portion of A. W. Belfour's Test

4. Circle the item on the following list that is *not* a proper use of cast iron pipe:

   a. Steam fittings

   b. high pressure fittings

   c. soil pipes and fittings

   d. gas cock bodies

5. The local community college is replumbing one of the chemistry labs. While most of the lab is a general purpose area, two desks and supply tables are used for experiments that require distilled water from a supply source. What kinds of piping would be suitable for plumbing this area given what you know about the characteristics of different types of pipe?

   Answer _____

   _____

6. Given two 90° ells, how long must you cut a piece of 1" pipe to give you a c.c. measurement of 22 inches with both ells attached?

   Answer: _____

   _____

   _____

Answers:

4. b
5. glass, tin
6. Cut the pipe 20" long, thread and screen on both ells. A c.c. will be 22 inches.

Additional Information

For additional information on developing and using tests of knowledge and skills, you may refer to the following books.

R. L. Ebel. *Essentials of Educational Measurement, Third Edition.* Englewood Cliffs, NJ: Prentice-Hall, Inc., 1965.

N. E. Gronland. *Constructing Achievement Tests.* Englewood Cliffs, NJ: Prentice-Hall, Inc., 1968

W. J. Popham (Ed.) *Criterion-Referenced Measurement.* Englewood Cliffs, NJ: Educational Technology Publications, 1971.

Self-Test Exercises

Answer the following questions and compare your answers with those provided in the appendix of this booklet.

1. After reading each of the following scenarios involving a related subjects instructor, decide what type of test was employed in each situation.
   A. A related subjects instructor in glazing decided to assess apprentice understanding of types of sealants. He described ten different situations in which a sealant was to be used and asked each apprentice to identify the most appropriate sealant, given the circumstances. This was an example of a what type of test?

      Answer: _____

   B. Each machinist apprentice was required to answer correctly 80% of twenty equations that required solving for an unknown. This was an example of what type of test? Answer: _____

      A meat cutting apprentice was required to identify by name six major cuts of beef from a forequarter. This was an example of what type of test?

      Answer: _____

2. Read each of the following two test items and note the problems with the item in the blanks provided after each item.
   A. In our course on printing composition processes, four types of indentation were taught. They were: straight matter, poetry, _____ and _____ _____.

      Problems Noted:

      _____

      _____

   B. Which of the following items is not a safety rule for using a hammer properly:

      1. Don't strike wood or plastic handled chisels.
      2. Don't pound with cheek of hammer.
      3. Don't pound sharp objects with mallets.
      4. Always tap object lightly before hard strike to set eye on target.

      Problems Noted:

      _____

      _____

3. Skill: Assess Apprentice Work-Related Attitudes And Values

Introduction And Objectives

Have you ever known a worker who got fired because his or her behavior—not his or her craft skills—did not match the behavior expected by the foreman, supervisor or owner? Somehow the worker did not learn, or did not know, expected behavior patterns for employees. An apprenticeship program with a comphehensive related instruction component might have helped that fired worker. Related instruction not only provides apprentices with technical information associated with job skills, but also is an opportunity to teach and reinforce appropriate work attitudes and values. Such attitudes and values are important because they directly affect employee success and satisfaction on the job. Perhaps more important, work attitudes and values also affect two increasingly important concerns in today's workplace: productivity and product quality. Characteristics like pride in work, adherence to rules, following directions, punctuality and other work attitudes and traits are hallmarks of successful employees. They influence work that results in reliable products and increased efficiency.

This chapter is about assessing work-related attitudes and includes directions for constructing and using instruments to evaluate apprentice work attitudes and values. After you have completed work in this unit, you will demonstrate your competence in assessing attitudes by being able to:

1. Identify and list the work-related attitudes required by an apprentice in order to function with approval in the workplace.
2. Design and construct an instrument for assessing and recording work attitudes.

What, Why And When Use The Skill

Work-related attitudes and values are an important part of every job or training setting. Frequently the emphasis is implied. However, in some settings, particularly if an employee does not conform to behavioral norms, appropriate attitudes are clearly defined. In this chapter, it is assumed that work attitudes will be defined within related studies.

Employees must know and follow the behavior rules for a job. For example, if working with fellow employees is critical to the job, then workers must conform to certain rules for interaction. If interaction with the public is important, then certain rules for dress, manner and discourse must be followed on the job. In each instance, these rules could be addressed in related instruction as a specific course content. In fact, you should include the ideas in your performance objectives, design your evaluation instruments around the attitudes, and include the information as part of the data you provide to the program sponsor.

Assessing work-related attitudes and values is different from the typical testing in related subjects instruction because usually there is no single correct answer for any question or item. Instead, the real issues are to determine (a) what attitudes are important and (b) where or how to set the cutpoint that divides good and poor attitudes on any particular topic.

Several types of assessment instruments are used to quantify and describe attitudes. These include tests, rating scales and anecdotal records. The latter two types of assessment are recommended for related subjects instructional settings. A typical test is not recommended because it is a self-reporting document, and an apprentice could tell you anything he or she wanted to tell you.

There are several cautions to remember in constructing attitude instruments. First, you must have several examples of behavior. Assessment of work-related attitudes ideally should occur either continually or periodically throughout the period of related training. You must observe apprentice behavior in a number of situations and settings since attitude assessment implies that present behavior is a good indicator of future behavior on the job. Second, however and whenever assessment of apprentice attitudes takes place, always remember that you must treat the results confidentially. Third, you must respect individual rights and dignity in performing the assessment and you must treat each apprentice impartially. Fourth, realize that you are making educated guesses about apprentice attitudes. You can never really know for sure, so allow for the possibility that your judgement is incorrect.

How To Construct An Instrument For Assessing Work Attitudes

Follow the suggested steps for constructing assessment

instruments to asess in order to save time and improve your assessment capabilities.

Step 1: Make a List of Attitudes and Values

Consider trades and crafts for which the members of your related instruction class are training. List each work-related attitude, characteristic or trait that is important to each of those jobs on a sheet of paper. On the same sheet, beside each listed trait, note briefly why the attitude or trait is important—specifically how does it influence performance? In trying to identify attitudes and traits it is usually helpful to consider factors such as social and organizational contexts of work, procedure and product performance specifications, and employee discretion. Also consider the responsibility, authority and decisions each apprentice must make.

Step 2: List Behaviors Indicating Good Attitudes

After listing each attitude or trait, consider the set of performances by a worker that demonstrate that the worker has a positive orientation toward each attitude. In addition, imagine a set of performances in which the worker demonstrates a negative orientation toward the attitude in question. Note the elements of the positive orientation on the appropriate line next to the characteristic.

Step 3: Rank Attitudes

Rank the work attitudes, characteristics and traits according to their importance in the trades for which the apprentices in your class are training. Enter the rank beside each item.

Step 4: Incorporate Attitude Objectives in Your Instructional Plan

Develop several performance objectives that express the expectation that apprentices will master and display the most important work attitudes or characteristics. Include these in the course description and instructional plan. It may be appropriate to expect different levels of attitudes for apprentices in different years of training.

Step 5: Construct and Use Assessment Instruments

Taking the attitudes or characteristics judged to be most important by your rankings, decide what instruments you need to assess attitudes. Once you have decided how you want to assess attitudes, construct and use the instruments to assess work-related attitudes. The following descriptions of rating scales and anecdotal records will help you do this.

Rating scales

Rating scales are instruments that permit an observer to focus on specific critical aspects of job performance and to assign that performance a numeric value on a scale. When using rating scales make observations at regular, prescribed intervals. Score the scale by averaging the rating on similar items or categories of items. The general rules to follow in constructing and using a rating scale are the following:

1. Include on the scale each item or element to be rated as a separate rule, together with the rating scale and the directions for use.
2. Rate each item or attribute one element at a time and mark the judgement in the correct spot.
3. Rate each item according to an initial judgement and do not change the rating at a later time.
4. Rate each item in accord with prespecified performance criteria. Avoid extreme ratings and avoid the influence of past performance and extraneous influences.
5. Use consensus or multiple ratings when possible.

Figure 4 illustrates a typical work attitude rating scale. The sample scale is designed for use with individual apprentices. It has a uniform date of observation, includes a series of items covering many work attitudes, and is scored by circling a number that represents the value of the performance observed.

Anecdotal records

Anecdotal records are a second type of instrument for assessing work-related attitudes. Anecdotal records require observation, but are not as formal as rating scales. Instead, use them to note behavior as you work each day with the apprentices in your charge. They are most useful if the instructor looks for critical incidents or behavior that can be associated with attitudes. The behaviors or attitudes should be specified in the expectations or course objectives that you prepare and explain in advance of instruction.

Figure 5 is a sample anecdotal record that you can use to chart apprentice behavior. The chart in the figure is focused on work attitudes. It provides a record for you to use when talking with individual apprentices and when making recommendations to the program sponsor. The example in this illustration focuses on incidents when the apprentice displays inappropriate behavior. All behavior not noted is assumed to be appropriate. You can design the record to note either positive or negative critical incidents. Negative incidents are easier to notice and record, ***but are not as beneficial to the apprentice.*** Positive incidents tend to reinforce positive behavior.

Figure 4: Work Attitude Rating Scale

Apprentice Name: _____

Date of Observation: _____

The above named apprentice demonstrated the level of performance indicated below on the listed work attitude attributes during this related subjects term:

Areas of Concern	Level of Performance Low				High
1. Demonstrates punctuality by being on time and rarely absent	1	2	3	4	5
2. Shows considerable interest in working in the trade	1	2	3	4	5
3. Approaches work in a resourceful manner	1	2	3	4	5
4. Completes an appropriate amount of work	1	2	3	4	5
5. Finishes products that meet or exceed industry-accepted standards	1	2	3	4	5
6. Uses tact in expressing self and interacting with others	1	2	3	4	5
7. Follows directions, instructions and prescribed procedures	1	2	3	4	5
8. Accepts and uses suggestions of and instruction from the supervisor	1	2	3	4	5
9. Does not interfere with work being done by others	1	2	3	4	5
10. Works cooperatively with others	1	2	3	4	5
11. Exercises care in handling and use of tools, equipment, and materials	1	2	3	4	5
12. Follows industry-accepted safety rules	1	2	3	4	5
13. Seems to enjoy work and working	1	2	3	4	5
14. Demonstrates pride in working performed	1	2	3	4	5
15. Exhibits appropriate industry-related grooming, dress and hygiene practices	1	2	3	4	5
16. Works steadily with few breaks	1	2	3	4	5
17. Does what he/she say they will do	1	2	3	4	5
18. Seeks to improve job performance	1	2	3	4	5
19. Has a positive, balanced outlook about life in general	1	2	3	4	5
20. Can be counted on to fulfill work responsibilities	1	2	3	4	5

- Number of attributes scored high _____ low _____
- Areas needing continued work _____
- Overall recommendation _____

Figure 5: Anecdotal Record of Apprentice Work Attitude

Name: _____

Time Period/Term: _____

The above named apprentice is considered to exhibit appropriate tradesworker responses to the work attitudes listed below unless otherwise noted

Date of Problem	Item	Comments
	I. Dependability	
	a. At assigned work station or in class within 3 minutes of expected time	
	b. Responds truthfully	
	c. Stays on the job without excessive breaks	
	d. Completes tasks in required time	
	e. Does what he/she say they will do	
	f. Follows directions, instructions and prescribed procedures	
	g.	
	II. Acceptance of Supervision	
	a. Accepts and uses supervisors' suggestions	
	b. Pays attention to directions and demonstrations	
	c. Discusses instructions but does not argue	
	d.	
	III. Personal Standards	
	a. Maintains appropriate and acceptable personal grooming practices	
	b. Maintains appropriate and acceptable personal hygiene standards	
	c. Indicates positive outlook about future	
	d. Demonstrates a desire to work	
	e.	

IV. Working With Others

			a. Does not interfere or hinder work of others	
			b. Treats co-workers cordially	
			c. Helps others when requested to do so by supervisor	
			d. Interacts appropriately with co-workers	
			e.	

V. Performance Quality

			a. Exercises appropriate safety precautions at work and learning stations	
			b. Performs consistent with demonstrated levels of ability and skill	
			c. Shows interest and enthusiasm for job and trade	
			d. Demonstrates initiative, resourcefulness and aggressiveness	
			e. Works steadily and at an appropriate speed	
			f. Checks work for accuracy and quality	
			g. Produces an acceptable amount of work	
			h. Organizes work, materials and tools prior to undertaking task	
			i. Does not abuse or misuse tools, equipment and materials	
			j. Recovers quickly from setback or adversity	
			k.	

Example

Frederick Daily was a related subjects instructor in an apprenticeship program for the Automotive Service Council. He knew that the apprentices, when they became journeymen, would be required to work harmoniously with other workers as well as to interact with the public. Interacting with the public was viewed as particularly critical because of increasing costs of auto repair and newspaper reports about some mechanics—not associated with the Council—who had done shoddy work. Therefore, work-related attitudes such as honesty were perceived to be of utmost importance. Daily, therefore, incorporated attitude instruction and assessment into his related subjects course. As he analyzed the jobs for which the apprentices in his charge were training, he decided that three categories of work-related attitudes were important: (a) customer relations attributes; (b) honesty; and (c) pride in work. As he visualized the performances of workers that would demonstrate positive and negative behaviors of these attributes, he generated the following list of critical performances:

1. Uses tact expressing self and working with others;
2. Exhibits industry-accepted personal grooming, dress and hygiene practices;
3. Does what he/she says they will do;
4. Works steadily with few breaks;
5. Completes work that meets or exceeds standards of quality;
6. Demonstrates pride in work performed; and
7. Appears to enjoy work and working.

Daily decided that he would develop a rating scale to note the behavior of each apprentice on each item. Further, he decided that he would rate apprentices monthly on each of these characteristics. He would then develop a summary rating at the end of the related studies period. He decided to use a four-point rating scale to assign a value to apprentice behavior about each item. Figure 6 shows the rating scale for one of Daily's students.

Additional Information

For more information about assessing attitudes and values, refer to the following:

J. A. Green. *Introduction to Measurement and Evaluation.* New York: Dodd, Mead and Co., 1970.

J. P. Robinson, R. Athanasion, and K. B. Head. *Measures of Occupational Attitudes and Occupational Characteristics.* Ann Arbor, MI: ISR of the University of Michigan, 1974.

T. D. Ten Brink. *Evaluation: A Practical Guide for Teachers.* New York: McGraw-Hill Book Co., 1974.

H. C. Triandis. *Attitudes and Attitude Change.* New York: John Wiley and Sons, Inc., 1971.

Self-Test Exercises

Answer the questions below in the space provided or on work paper. Compare your answers with those provided in the appendix of the booklet.

1. List as many of the work-related attitudes as you can for the jobs for which apprentices in your charge are training.

2. List the advantages to your using a rating scale as opposed to using an anecdotal record.

3. Design an anecdotal record for use with the apprentices in your charge. What elements are included on the record?

Figure 6: Work Attitudes

Attitudes	Ratings 4 = Excellent, 3 = Good, 2 = Fair/Questionable, 1 = Poor October	November	December	Term Composite
1. Uses tact in expressing self and working with others	1 2 (3) 4	1 2 (3) 4	1 2 (3) 4	3.0
2. Exhibits industry-accepted personal grooming, dress and hygiene practices	1 (2) 3 4	1 (2) 3 4	1 2 (3) 4	2.3
3. Does what he/she says they will do	1 2 (3) 4	1 2 3 (4)	1 2 3 (4)	3.7
4. Works steadily with few breaks	1 2 (3) 4	1 2 (3) 4	1 2 (3) 4	3
5. Completes work that meets or exceeds standards of quality	1 2 (3) 4	1 2 3 (4)	1 2 (3) 4	3.3
6. Demonstrates pride in work performed	1 2 3 (4)	1 2 3 (4)	1 2 3 (4)	4.0
7. Appears to enjoy work and working	1 2 3 (4)	1 2 3 (4)	1 2 3 (4)	4.0

Apprentice Name: _____

4. Skill: Discuss Individual Evaluation Results With Apprentice Learners

Introduction And Objectives

Evaluation consumes a substantial amount of teacher and instructional time. To ensure that the investment of time and effort pays an adequate return, you must consider the uses of test results as you construct the instrument.

Test or evaluation results should be used for three major purposes: (a) feedback to apprentices; (b) feedback to the instructor; and (c) certification and permanent record of results. Each use requires that you as a related instructor employ different skills. This chapter is about providing feedback to apprentices by discussing individual evaluation results with trainees. When you have completed your work in this section of materials you will demonstrate your competence in this skill by being able to:

1. List and discuss in writing the major functions of using individual evaluation results with apprentice learners.
2. Outline a technique for providing feedback systematically to apprentices in your class.

As you work through the following materials you should think about how test results currently are conveyed to apprentices in the program. Does the following information suggest uses of results that you do not practice routinely in your class?

What And Why Should You Discuss Test Results

A major purpose of evaluating learning is to provide feedback to apprentices about their success in learning subject matter and skills. In that capacity, testing provides information that stimulates and clarifies the learning task, serves as a study aid, provides a reward and produces appropriate work attitudes. Each function benefits the apprentice and the employer.

Stimulates And Clarifies The Learning Task

Discussing the results of performance testing clarifies the learning task. It directs apprentice attention to certain topic areas, emphasizes certain content, focuses on certain types of learning and encourages the use of short-term goals. Take, for example, a segment of a related subjects course in graphic arts where the principles of color were being discussed. The discussion of evaluation results using prespecified objectives established the outcome expectations for each past and future section of materials for the apprentice. Objectives included outcomes such as naming primary colors, describing the interaction of various ink colors and grades of paper and matching appropriate color of paper and ink for various types of printing jobs. The objectives and the evaluation exercises based on these objectives indicated precisely what performances and levels of proficiency were expected of the apprentice after instruction. This, in turn, suggested the specific content that was to be mastered. It also provided a specific, short-term time period and goal in which to learn the material. Further, when the format was followed consistently, apprentices learned to focus efforts on ideas presented in objectives and verified through the discussion of evaluation.

Service as a Study Aid

Discussing test results serves as a study aid for the learning task by demonstrating the relationship between related studies and job task performances. The opportunity to practice knowledge application in real or simulated situations is available to the apprentice attempting to master related materials. Further, such practice, even if performed in written or simulation situations, offers an opportunity to transfer skills and knowledges from one situation to another. This reinforces retention of content.

Provides A Reward

Discussing test results also serves as a reward for learning. If the testing is an effective performance achievement test, apprentices clearly earn their test score by their own efforts. Acknowledgements of mastery demonstrate a positive return for an investment of apprentice time as well as provide a visual public and private record of performance. Further, acknowledgement of mastery as a reward makes learning more efficient because most learners come to value the reward as an incentive.

Produces Appropriate Work Attitudes

A final critical outcome of discussing test results with individual apprentices is assisting each apprentice to develop appropriate work attitudes. Use of test results as part of the instructional process helps to instill the notion of the appropriateness of work (process and product) assessment on the job by supervisors and foremen. Accepting and using the results of work evaluation on the job is an important learned behavior. It is important not only to work, but also to job retention and advancement. It reinforces the ideas of quality control, merit advances, taking directions and the legitimacy of external evaluation.

When And How To Discuss Test Results

Any of these functions of discussing evaluation results requires a structure and forum for presenting and using the information. Testing results can be discussed effectively with an entire related studies class, if it is done so no individuals are identified and if the class is working at the same general rate of progress on the same topic. A more preferrable procedure is individual conferences conducted at regular intervals throughout the related subjects instructional period.

Individual conferences provide you with opportunities to get to know each apprentice on a more personal basis. They also offer you an opportunity to enter the results of the test on the permanent record and obtain the apprentice's signature on the record in recognition of the grade, score or mark.

Individual conferences should be held on a regular basis, perhaps as often as every month. The discussion time can be used to clarify performance expectations, to assist the apprentice in structuring time, to discuss problems and concerns, and to bring closure to various segments of related instruction.

When holding the conferences, establish a general agenda of topics and time to follow with each apprentice. The agenda can be modified with individual, personalized concerns as needed. When such conferences are used to discuss upcoming content, to talk about performance, or to solve personal work-related problems, they have been demonstrated to improve adult learning.

Your conferences will be most useful if you follow a series of precedural guidelines for conducting the activity.

Step 1: Develop an Agenda

Establish and follow an agenda for each conference. The agenda generally can be identical for each apprentice. The agenda should be written; should indicate the time, date and name of each apprentice; should list each topic to be addressed; and should include a space for noting the discussion and/or resolution regarding each topic.

Step 2: Develop a Schedule

Schedule a time for all conferences and post it in a public place at least one week before initiation of the first conference. The schedule should note the name, date, location and time for the conference with each apprentice. Also, the schedule should list the general topics of concern and indicate any prior preparation of materials that apprentices are expected to bring with them to the conference session.

Step 3: Prepare For Each Conference

Review information such as grades, progress, attendence and results of past conferences on each individual apprentice before the time for the conference. Make notes in the margin of individual's agenda about particular points or concerns you want to raise during the conference.

Step 4: Conduct the Conferences

In conducting the conference, use the time efficiently and effectively. Start on time, move crisply from topic to topic, and address any subject of concern to either you or the apprentice. Effective conferences can be as short as 10 minutes or as long as 30 minutes.

Establish a conference atmosphere that is comfortable yet work-like. You should assume the role of a foreman or supervisor and the apprentice that of a worker in your charge. In those roles, you will serve both as advocate for and evaluator of apprentice work. You want the apprentice to succeed and to perform well both because it represents growth for the apprentice and be cause it reflects well on you. Your discussion must be frank and open, without reprisals and without carrying over into the classroom. You should offer evidence and examples to support the points or conclusions you make during the conversation. Equally important, you must listen to the concerns and points offered by the apprentice. Remember that the tone you set in the conference may be a major factor affecting apprentice productivity in the classroom and on the job.

As you move through the agenda, one point at a time, enter notes and resolutions about each topic at an appropriate place on the written agenda. When possible, have the apprentices establish short-term training goals for agenda topics for themselves. Commit these goals to the written record. At the conclusion of the conference, both you and the apprentice should initial the written record of the agenda. The record should be filed in the individual apprentice's record folder in the file cabinet so that both you and the apprentice can refer to it through the next work period.

Example

Issac James was a related subjects mathematics instructor in a large shipyard apprenticeship program. The program in which James trained apprentices in more than a dozen different apprenticeable occupations including electrician, welder, shipfitter, pipefitter and sheetmetal worker. James' geometry and algebra related subjects classes usually included apprentices from four or five different occupations. Further, his classes were usually large and the apprentices possessed a wide variety of backgrounds and skills.

One result of the diversity was James had noticed that every time he taught the class some apprentices usually had trouble completing the mathematics requirements successfully. Additionally, they often seemed frustrated with their grades. Further, grades held different values for different trainees.

James decided to use the technique of individual conferences to discuss grades and to set content goals for each apprentice during the mathematics classes he taught. He decided that even though each of his classes was only six weeks in length, he could schedule ten-minute conferences every two weeks with each apprentice for both the algebra and geometry sections. He followed the steps outlined in the unit on discussing test results and began the first set of conferences after the first test. The first agenda he constructed is presented in Figure 7. Note that James wrote out the agenda and filled in the form as the discussion with apprentice Howard Tilley occurred. He addressed content and results of the test recently taken; general progress in the program; upcoming topics and contents; and goals for the upcoming content and sessions. When the conference was completed, James placed the agenda for each apprentice in the work folder for that apprentice.

James found that after the first two conferences, he could set the conferences at three week intervals. After several sessions of conferences James found that both apprentice test scores and reports of satisfaction with training had improved.

Additional Informantion

For more information about the use of test results in an instructional setting, see the following references:

J. A. Green. *Teacher-Made Tests.* New York: Harper and Row, 1963, 1975.

W. P. Gorth, R. P. O'Reilly, and P. D. Pinsky. *Comprehensive Achievement Monitoring.* Englewood Cliffs, NJ: Educational Technology Publications, 1975.

Self-Test Exercises

Please answer the following questions in the space provided or on separate work paper. Check your answers by referring to the appendix in the back of the booklet.

1. List in one sentence, short-answer form the four major benefits of discussing test results with apprentices.

2. Stephen Carlton was related instructor in a sheetmetal apprenticeship program. He felt that he was not getting the maximum effort from his apprentice charges so he decided to initiate individual conferences to discuss test results and set academic goals as a motivator. He followed the first several steps outlined in the materials regarding conferences including constructing an agenda, setting up a schedule, reviewing past performance and so forth. However, he was unclear exactly how to behave in interacting with an individual apprentice during a conference. What major things would you advise Carlton to do in conducting the discussion in the conference? List five items.

3. Consider your trade and related subjects obligations and construct a model agenda for an individual conference with your apprentices. Check your model with the answer presented in the Appendix.

Figure 7: Sample Individual Conference Agenda

Agenda: Individual Conferences

Apprentice Name: Howard Tilley

Date: November 14, 1981 Time: 4:40-4:50

I. Feedback

A. Test Score: 78

B. Areas of strength and limitations: Strengths: Multiplication, Perimeters
Limitations: Volumes of irregular shapes, cylinders; Carelessness

C. Suggestions for additional work: Workbook, pages 67-72. Practice sheet #2

D. Discussion notes: Admitted failure to learn formulas. Missed materials on cylinders. Doesn't believe he is careless

E. Resolution of issue: Work will be completed by Nov. 20. Will retake parallel exam on Nov. 20.

II. General Progress in Program

A. Observation: Acceptable effort to this point - needs to proof work.

B. Apprentice satisfaction: Good. Would like additional worksheets

C. Discussion: Nothing to report.

III. Upcoming Topics and Contents

A. Content or Topics:

1. Angles and volumes of triangles
2. Pythagorean theorem

B. Application of information for apprenticeship: Shapes & contours

C. Expectations for success: 90% correct on criterion-referenced test

D. Apprentice Goals:

1. Make-up test = 95%
2. Test on next section = 90%

Attested: Instructor: _____ Apprentice: _____

5. Skill: Develop Instrumentation To Certify Skills And Knowledges Upon Completion Of Program Or Course

Introduction And Objectives

Once you have performed your evaluations, you must report the findings about individual performance regarding required knowledges and skills to the program sponsor. It is critical that you describe precisely *what* knowledges and skills each apprentice possesses and explain *how well* the level of knowledges and skills acquired compares to trade standards. Further, you must report that information systematically for each apprentice. This means that you must create and use a consistent record-keeping system for certifying and reporting skills and knowledges for all apprentices. This chapter is devoted to providing you with ideas and formats for maintaining standardized individual and group knowledge and skill record keeping operations. When you have completed your work in this section of materials, you will demonstrate your competence in this skill by being able to:

1. List the critical elements in a systematic certification record.
2. Critique and develop sample instruments useful to certify apprentice knowledges and skills.

As you work through this unit of materials, examine the instruments and devices you use currently to certify and report related subjects knowledges and skills. Do they indicate the necessary information?

Why, When And What Is Record Keeping About

You are obligated to keep records for both legal reasons and for keeping track of apprentice learning activities. The most important consideration concerning the legal aspects of record keeping and certification of skills is that the apprenticeship agreement is a training contract in which the requirements of both the apprentice and the apprentice trainers are specified. You are obligated to provide instruction in certain job related topics. Likewise, you are obligated to provide the specified instruction either for a certain number of hours or until specified performance outcomes are achieved by the apprentice. This means that you are obligated to keep records of apprentice performance, attendance and time in instruction by content. These records document apprentice progress and, in most training programs, are used by the program sponsor to make decisions about advancing the apprentice in grades of pay and responsibility. Your records must be accurate, current and in sufficient detail for making recommendations and decisions about each individual apprentice.

A second important legal aspect of grading and record keeping is that the performance standards for each apprentice in a trade or craft must be reasonably similar. Performance outcomes and types of reporting in related subjects instruction cannot vary appreciably from apprentice to apprentice. Not only are you required to certify to the program sponsor that the apprentice has mastered certain necessary skills and knowledges, but also you are expected to provide your judgment on expected succeess in the trade for each apprentice. Make certain that you assess apprentices using equal means and report findings in similar ways. The equal opportunity is particularly critical given that some apprentices simply do not master the necessary knowledge and skills to become certified journeymen and some apprentices do not complete their training.

A final important legal aspect of related subjects instruction records involves reimbursement. Because funds to support the related instruction activity may come from one or more of a variety of sources (i.e., union training funds, employer training budget, state education agency) you must be able to certify the contact hours of instruction and the hours of facility use for each apprentice.

Records also are important for keeping track of apprentice learning activities. A visible progress record for all apprentices is an effective motivational device. Even more important, by keeping composite performance records, over time you as a related subjects instructor can make logical teaching decisions about how to adjust content, modify criteria, pace materials and so forth for future groups of apprentices in related subjects instruction. For example, suppose from your progress record of related subjects general physical science instruction you found that some apprentices had difficulty mastering information on the principles of electrical resistance but had little trouble with the concept of battery storage of electrical current. Then you could seek to (a)

provide modified information about electrical resistance; (b) increase the length of time spent on electrical resistance while decreasing the time spent on battery storage; and (c) review and perhaps modify the criteria related to the study of electrical resistance. Your composite record of apprentice progress would suggest and justify your decision to alter instruction on the two topics.

Whatever record keeping and reporting system you use, it is critical that the records be accurate and up-to-date. Make your entries as often and as long as necessary in order to insure that at any time up to four years later, a sponsor such as a LJATC making a final appraisal of an apprentice's skills and knowledges could determine precisely what the record was reporting.

How To Set Up A Record Keeping And Reporting System

The procedures recommended in setting up a record keeping and reporting system are tied to the type of record being developed. It is recommended that you keep one overall record of composite progress and two types of individual records, one for knowledges/skills/attitudes and one for time. The procedures are suggested as steps and described in the following paragraphs.

Step 1: Explore Different Record Systems

Talk with the program sponsor—LJATC, employer or school—to determine if the specific type of record keeping and reporting system is prescribed. In addition, consult industry standards to determine if suggestions about type of record systems are offered. If so, use these ideas in conjunction with the ideas offered below.

Step 2: Develop And Use an Overall Performance Record

Consider the alternative ways for maintaining an overall progress record of apprentices. Choose one possibility and develop and use the instrument. Two types of progress records are suggested. One is a type of bar graph as displayed in Figure 8. This type of record is a graphic used for public display of the general progress of each apprentice. Apprentices' names are listed in the left-hand column. Content areas or performance objectives are listed in the numbered areas across the top of the figure. As each apprentice performs to the level of success for each criteria within each objective, a check or line is extended from the appren-

Figure 8: Progress Record of Apprentices

Apprentice Name	Performance Objective/Content Area									
	#1		#2		#3		#4		#5	
	Criterion		Criterion		Criterion		Criterion		Criterion	
	a	b	a	b	a	b	a	b	a	b
1.										
2.										
3.										
4.										
5.										
6.										
7.										
8.										
9.										
10.										

Figure 9. Long-Term Performance For Related Studies

Performance Objective/ Content Area	Length of Time for Majority Mastery	Number of items Correct	Percent of Apprentices Correct	Mastery Criteria Level		Percent Mastery
				Criterion #1	Criterion #2	
1.						
2.						
3.						
4.						
5.						

tices' name through their current end point. The progress chart should be on public display and should be up-dated each week. It will permit you as the instructor (as well as each apprentice) to monitor individual progress.

A second type of progress schedule is more for your decision making and is not necessarily intended for display. This type of record is illustrated in Figure 9. As you will note, the record systematizes collection and storage of summary data from apprentices over a period of time on each of the performance objectives or content areas in related subjects instruction. The record requires that you note information such as the time required by most apprentices to learn the materials, the average score on each criterion for groups of apprentices and the average number of items answered correctly. Such information is useful to you as you make future instructional decisions about materials, content and criteria.

Step 3: File Records

Set aside a space such as a single file drawer or a box as a file for apprentices's records. Provide a folder or envelope for each apprentice. Put the apprentices' name on it and place it in the file. Discuss the file in class so that each apprentice knows where his or her file is and the rules pertaining to its use and access.

Step 4: Develop and use time records

The majority of apprentice sponsors require a given number of hours be spent in related subjects instruction and on particular topics. For example, an apprentice program for the American Public Works Association might specify at least 144 hours of related instruction per year. Assume that within that 144 hours during the final year, 15 hours must be spent on studying communication skills, 10 hours on law and labor relations and so forth. You as a related subjects instructor must keep track of each apprentices' time in class and on each topic. Figure 10 is a record that facilitates keeping this kind of data. Note that the record should be maintained for each apprentice and that the record includes data on outcomes, attendance and topics for each month or two of the related subjects experience. It is often useful to maintain a second copy of the record in the apprentice's individual file.

Step 5: Prepare and maintain individual progress records.

This record should be updated with each assessment activity, should be initialed by the apprentice and the instructor (in an individual conference), and should be kept as part of the individuals's record. This record should be copied and provided to the program sponsor as the formal final reporting for each apprentice for each related studies term. A sample record form is illustrated in Figure 11. Note that the record provides an opportunity to note the times of assessment and the date of sucessful performance for each criterion for each proposed outcome and performance objective. Also note that there is a space provided for the apprentice to initial the results of each assessment. Taken together with the time record, the progress record provides the necessary final/permanent certification to the program sponsor.

Individual Time Record

Apprentice's Name: _____

Month or Term: _____

Performace Objective/Content	Period of Attendance											Time on Topic									
	Dates											Dates									
	1	2	3	4	5	6	7	8	9	10		1	2	3	4	5	6	7	8	9	10
1.																					
2.																					
3.																					
4.																					
5.																					
6.																					
7.																					
8.																					

Figure 10

Example

An example of the need for and operation of a record keeping system might be found in the training program of the local electrical apprentice training program. Assume that the program was directed by a National Joint Apprenticeship and Training Committee. This meant that the content was pre-structured and that there was need for standardized records. Further, assume that employment demand in the industry was high in spite of a sluggish economy. Those factors usually meant that competition was keen to become an apprentice and to become a licensed journeyman electrician. The training programs were large, each involving several related subjects instructors, thus increasing the need for standardized and comprehensive records. Taken together, these factors suggested that individual time and performance records were a necessity. Time was kept for overall attendance and for time-on-content because in the national curriculum a given number of hours were prescribed for subjects such as aspects of algebra, trigonometry, blueprint reading and on-the-job safety. In the performance area, national and local standards provided established criteria for successful performance for each content area. Further, because of the industry-wide concern for assuring quality workmanship, positive work attitudes were being emphasized. Related subjects instructors, therefore, found it beneficial to maintain individual performance records that included content and attitudes as well as an attendance record. The record was filed at the end of each term with the LJATC and used as the primary basis for issuing pay and responsibility advancements to apprentices.

Individual Apprentice Progress

Apprentice's Name: _____

Term of Instruction Period: _____

Performace Objective/Content	Time of Assessment	Date When Criterion-Level Meet	Criterion # 1 Level for Sucess	Criterion #2 Level for Sucess	Apprentice Initials
	Dates	Dates			
1.					
2.					
3.					
4.					
5.					

Figure 11

Self-Test Exercises

Please answer the following questions in the space provided or on separate work paper. Check your answers by referring to the appendix at the back of the booklet.

1. List two reasons for maintaining certification records in related instruction.
2. Design an apprentice performance record for your class.

6. Appendix

Answers To Self-Test Exercises

2. SKILL: Assess Trainee Knowledge And Skills

1a. Simulation-situation
1b. Simulation-situation
1c. Knowledge-identification

2a. Blanks give clues to correct answer.
2b. Use of negative construction; correct answer was longer; correct answer was stated as only option in positive construction.

3. SKILL: Devise Means And Asess Apprentice Work-Related Attitudes And Values

1. Among the categories of concern you should have considered are:

   a. Trustworthiness/dependability
   b. Work habits/patterns
   c. Quality performance
   d. Personal standards

2. Advantages of use of rating scale include:

   a. Numerical value to behavior
   b. Comparable ratings for each apprentice
   c. Emphasis on all important points
   d. Ratings at regular intervals

3. The elements that the anecdotal record must include are:

   a. Identification of individual apprentice
   b. Date of occurrence of critical incident
   c. Accurate description of incident

4. SKILL: Discuss Individual Evaluation Results With Apprentice Learners

1. The four major benefits of discussing test results with apprentices are:

   a. Stimulate and clarify learning task
   b. Serve as a study aid
   c. Provide a reward
   d. Engender appropriate work attitudes

2. Suggestions for conducting a conference include:

   a. Start on time and use time efficiently
   b. Make the apprentice comfortable
   c. Assume the role of a supervisor
   d. Be frank and open
   e. Offer evidence to support the topics of discussion
   f. Listen to and address the apprentices's concerns
   g. Don't let the discussion carry over negatively to the classroom
   h. Follow topics outlined in agenda
   i. Encourage training goal setting on the part of the apprentice
   j. Agree on goals for the next training period

5. SKILL: Develop Instrumentation To Certify Skills And Knowledges Upon Completion Of Program Of Course

1. Reasons for maintaining certification records:

   a. Satisfying the legal aspects of the apprenticeship agreement:
      — Certifying that apprentices completed required instruction
      — Certifying that apprentices possess necessary skills
      — Providing information for reimbursement for training sponsors

   b. Keeping track of apprentice learning activities in order to make instructional decisions

Posttest

Directions: *Read the folliwing questions and write your answers in the spaces provided. Check your answers with the suggested answers that follow the questions. If you answer at least 70 percent of the questions correctly, continue your work in Module #10. If not, repeat the sections of this module with which you had greatest difficulty.*

1. Arrange the following types of tests from most realistic to least realistic.

   a. Stimulation - situation

   b. Work sample

   c. Knowledge - identification

   Answer: _____, _____, and _____.

2. Which of the following items is *Not* a rule for writing multiple choice test items?

   a. Present only one closely formulated idea in each question.

   b. Construct about four alternatives for each item.

   c. Use irrelavant information as detractors in the alternatives.

   d. Avoid, where possible, correct alternatives that are gramatically different from the question.

Read short-answer items numbered 3, 4, and 5 and indicate the limitations of each item in the space provided.

3. The formulas for determining the area of different types of shapes are different. For example, the formula for calculating the area of a triangle is A = ½ bh. The formula for calculating the area of a rectangle is

   _____.

   Limitations: _____

4. What scientific principle or law explains why objects in motion tend to remain in motion in a straight line until an external force is exerted upon the object?

   Answer: _____

   Limitations: _____

5. What effects does posture of the listener have on the speaker during a conversation? Answer: _____, _____ _____, and _____.

   Limitations: _____

6. Select the letter of one kind of test for which checklists are useful.

   a. Work sample

   b. Knowledge - recall

   c. Simulation - situation

7. Select the letter of the item that is least critical to include in a set of test directions:

   a. test purpose

   b. time available for testing

   c. how to record answers

   d. type of test being used

8. Critique the following test item, listing the limitations of the item.

   Which of the following rules is not a safety rule for using a hammer properly?

   a. Don't pound with shank of hammer.

   b. Always tap object lightly before hard strike to set eye.

   c. Avoid pounding sharp objects with mallets.

   d. Never strike wood or plastic handled chisels.

   Problem include:

9. List the four cautions associated with assessing work-related attitudes.

   a.

   b.

   c.

   d.

10. What two types of instruments are recommended for assesing work-related attitudes?

    Answers: _____ and _____

11. Which of the following reasons for discussing test results with individual apprentices is the weakest reason ?

    a. provides a reward

    b. serves as a study aid

    c. develops appropriate work attitudes

    d. stimulates and clarifies the learning task

    e. punishes learner for wrong answer

12. Identify the six procedural guidelines for conducting individual conferences.

    a.

    b.

    c.

    d.

    e.

    f.

13. Circle each of the following items that is an important reason for maintaining careful training records.

    a. motivate trainees

    b. report results or outcomes to the program sponsor

    c. provide information to guide reimbursement

    d. facilitate making instructional decisions

Read each of the following related subjects situations. Based on the information, suggest the most appropriate type of test for use.

14. Harmon Miller, a related subjects instructor in an electrical training program, was completing a unit in basic science. He had been teaching the concepts of circuits, resistance and current and had used many working models in class for demonstration purposes. He still had the models and wanted to be sure that the apprentices could find answers to problems about current and resistance in realistic circumstances. What kind of a test would you recommend he construct?

    Answer: _____

15. Jenny Simpkins teaches blueprint reading and measurement in a sheet metal apprenticeship program. Her major goal was to insure that the apprentices in her charge be able to read blueprints *and* use micrometers correctly. What kind of a test would you recommend she develop?

    Answer: _____

16. Rinaldo Tantaco teaches all first year apprentices in a general construction program. He has just completed a unit on the history of apprenticeship. What type of test would you recommend that he give?

    Answer: _____

Answers To Posttest

1. b, a, and c
2. c
3. Ambigious and contains unnecessary information.
4. None. It is a good question.
5. Answer blanks are not uniform and provide clues.
6. a
7. d
8. Double negative construction; use of never; use of always; failure to emphasize "not"; correct answer is clearly different. (Count it correct if you listed at least three.)
9. a. Treat information confidently
   b. Allow for the possibility of errors in judgement
   c. Test apprentices as individuals, equals, and with dignity
   d. Use as many samples of behavior as possible to draw conclusions. (Count it correct if you listed all four.)
10. Anecdotal records and rating scales
11. e
12. a. Establish and follow agenda
    b. Schedule and post conference times and locations
    c. Review information or topics on agenda and make notes on conversation
    d. Use time effectively/efficiently
    e. Assume role of foreman
    f. Behave systematically in addressing planned conversation. (Count it correct if you listed at least five.)
13. You should have circled items a, b, c, d, and e. (Count it correct if you marked at least four.)
14. Simulation - work-setting or situation
15. Simulation - work-setting or situation
16. Knowledge - identification and/or recall

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